



GE Nuclear Energy

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LEGEND OR DESCRIPTION OF GROUPS

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1.0 SCOPE/APPLICABILITY

This procedure provides the detailed instructions for performing and sequencing the various steps required to achieve a safe reactor shutdown from an operating power level of approximately [45%], utilizing the main condenser as a heat sink, including generator separation from the grid at approximately [10]% power.

2.0 DISCUSSION

Unit shutdown from approximately [45%] power includes separation of the turbine generator from the grid. Further power reduction may be subsequently conducted per IOP-8, "Unit Off-Line to Hot Standby or Hot Shutdown."

3.0 PRECAUTIONS AND LIMITATIONS

- 3.1 To prevent turbine overheating, low load operation of the turbine generator should be restricted to greater than [70] MWE.
- 3.2 The correct control rod pattern must be established prior to decreasing reactor power to the RC&IS Low Power Setpoint of [later] % thermal power.
- 3.3 As each control rod is fully inserted, verify that the FULL-IN indication is operable.

4.0 PREREQUISITES

- 4.1 Reactor power has been reduced to approximately [45%] per IOP-4, "Power Ascension and Power Changes".
- 4.2 The main turbine shaft lift pumps started and run for about [10]minutes to check their performance. Refer to SOP-[later], "Main Turbine Lube Oil System".
- 4.3 The automatic-start feature of the main turbine turning gear and main turbine lube oil pumps checked. [This operation is normally conducted locally. Refer to SOP-[later], "Main Turbine Lube Oil System".
- 4.4 The proper control rod sequence selected for reactor shutdown.
- 4.5 Notify the Load Dispatcher of pending unit shutdown.



5.0 PROCEDURE

5.1 General Procedure

5.1.1 As feedwater flow is decreased during the power reduction, remove individual condensate filter/demineralizers from service as necessary to maintain [later²] differential pressure across the in-service filter/demineralizers.

5.1.2 Maintain the turbine load setpoint [10%] above actual generator output as reactor power decreases.

5.1.3 Maintain RPV water level and pressure within normal control band.

5.2 Reduction to [20%] Power

5.2.1 Initiate control rod insertions to reduce reactor power to [20%]. During the power decrease, execute steps 5.2.2 through 5.2.4.

NOTE

As each control rod is fully inserted, verify that the FULL-IN indication is operable.

5.2.2 When reactor power has been decreased below [40%], verify that the following main steam line drain valves automatically open:

B21-F171, Inboard Drain Solenoid Operated Valve

B21-F221, Downstream Drain Solenoid Operated Valve to Condenser.

5.2.3 [Check that the Control Rod Pattern Controller will permit continued rod insertion below the RC&IS Low Power Setpoint [later]. If necessary, increase reactor power by increasing recirculation pump speed to maintain reactor power above [30%] for rod pattern adjustments.]



5.2 Reduction to [20%] Power(continued)

5.2.4 When total feedwater flow decreases below 25%, switch to Single-Element Control Mode in the Feedwater Control System. Confirm that RPV water level control is stable.

5.2.5 At [20%] power, open (or check open) the following main steam line drain valves:

- Inboard Drain, B21-F152,
- Downstream Drain, B21-F211.

5.2.6 Remove one turbine driven reactor feedpump from service per SOP-[later], "Feedwater and Condensate System".

5.2.7 Remove [designated] heaters and [check appropriate valve alignments], as follows: [L A T E R , many steps missing]

5.2.8 Switch house loads from in-plant power sources to external power sources per SOP-[later].

5.3 Power Reduction to [10%] Power

5.3.1 Continue to insert control rods in the prescribed sequence to decrease generator load and reactor power to approximately [10%].

5.3.2 Remove one LPCP and one HPCP from service, and place the motor-driven feedpump into operation. Stop the remaining turbine-driven feedpump.

5.3.3 Align CUW return flow to one feedwater line and isolate the other feedwater line to feed the vessel with one feedwater line in accordance with SOP-B21, "Nuclear Boiler System".



5.4 Generator Separation from the Grid

5.4.1 Notify the Load Dispatcher that unit is pending removal from his system.

5.4.2 Shutdown the Main Turbine Generator per SOP-[later], "Main Turbine Generator System".

5.4.3 Isolate steam to the first-stage reheaters as follows: [LATER]

5.4.4 Remove Bus Duct Cooling System from service per SOP--later.

5.4.5 Verify that the turbine bypass valves are controlling pressure.

5.4.6 [Open various MS/R and turbine and miscellaneous drain valves, later].

5.5 Continue power reduction in accordance with IOP-8, "Unit Off-Line to Hot Standby or Hot Shutdown".

6.0 REFERENCES

None.